

LIVESTOCK

Meat, Milk, and Eggs



Land Use

- Farmers use land to house livestock.
- Farmers use land to graze livestock.
- Farmers need land to grow feed for livestock.



3/4ths of all agricultural land is used for livestock.

Greenhouse Gas Emissions

- Carbon is released into the air when fields are tilled in preparation for planting crops that livestock eventually eat.
- Livestock such as cattle, goats, and sheep release methane, a greenhouse gas, into the air as a byproduct of their digestive process.
- Livestock manure produces the greenhouse gases, methane and nitrous oxide.
- As land is converted from a natural ecosystem to farm land, greenhouse gases are emitted.
- The production of plastic used in many types of food packaging contributes to CO₂ emissions.

Inputs

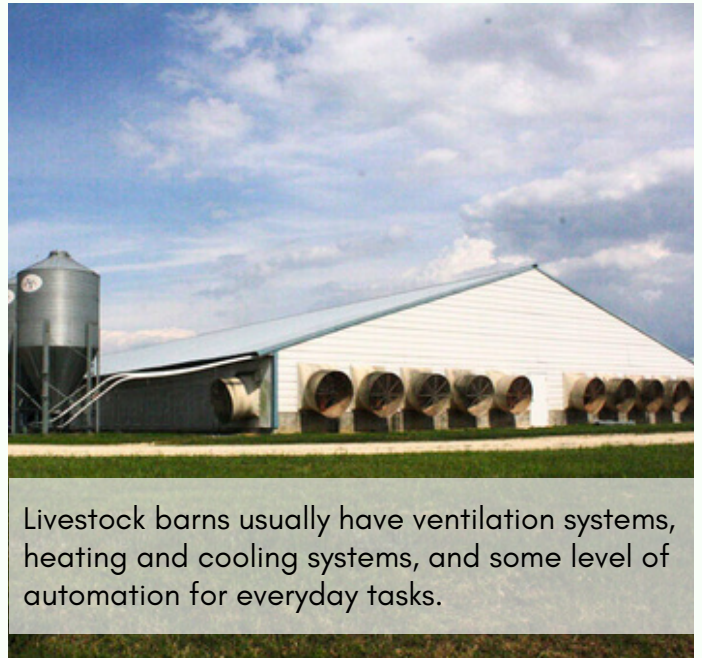
- Farmers need fertilizers and pesticides to grow crops for livestock to eat.
- Farmers rely on tractors and machinery to raise livestock.

Water Use

- Farmers need water for their livestock.
- Farmers need water to grow crops like alfalfa, grass, and grains which are fed to livestock.
- Farmers need water to clean facilities. For example milking parlors.
- Food processing plants use water to clean their facilities.
- Fertilizer use can contribute to water pollution.

Energy

- Farms require electricity for a variety of processes including ventilation systems, heating and cooling in housing systems, and to operate machinery
- Processing facilities use energy in the form of electricity for refrigeration and automated processing equipment.



Livestock barns usually have ventilation systems, heating and cooling systems, and some level of automation for everyday tasks.

Waste

- Any loss of a livestock animal on the farm would be considered food loss. All of the resources used to raise that animal did not yield a food product for humans and was therefore wasted.
- Animal-sourced foods require refrigeration. Any interruption during storage, processing, or transportation would lead to spoilage and ultimately food loss.
- Consumers create food waste if food is never consumed as it was intended.



Transportation

- Livestock are transported by semi-truck at different life stages. For example, a chick is born at a hatchery and then transported to a barn where it grows to the end of its life cycle.
- Final processing rarely takes place right on the farm. When animals are ready to harvest, they are usually transported to a processing facility. It may be close, but could also be hundreds of miles away.
- Food products are transported by semi truck from the processor to a retail distributor.
- Food products are transported from a retail distributor to the consumer after they are purchased.

FRUITS

Berries and Tree Fruits



Land Use

- Farmers need land to grow fruit crops.
- After the fruit harvest, land is needed for processing and storage facilities.



Greenhouse Gas Emissions

- Land-Use Change: Converting natural ecosystems to fields and orchards to grow food can release CO₂ from the vegetation that is removed and the soil that is disturbed by various forms of tilling.
- The production of plastic used in many types of food packaging contributes to CO₂ emissions.

Inputs

- Fertilizers are used to maintain the nutrient content of soil where fruit trees, bushes, and vines are grown.
- Fruits are susceptible to pests during the growing process. Pesticides help avoid crop loss.

Water Use

- Fruit crops in most climates use water for irrigation.
- Fertilizer use can contribute to water pollution.
- Water is used in the processing of fruit. Examples include cleaning equipment, water for blanching, or juice extraction.

Energy

- Sometimes fruit crops are grown in greenhouses. Fossil fuel energy is most common to heat and cool greenhouses.
- Most fruits require cold storage and refrigeration to lengthen the shelf life of the fruit so it can reach the consumer.



In this processing plant, cherries are being washed, pitted, and frozen. Each of these steps requires electricity.



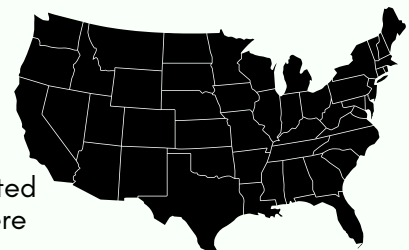
Do consumers have an expectation for all produce at the grocery store to be perfectly shaped and colored?

Waste

- Sometimes fruit is sorted and discarded if it doesn't meet specific aesthetic standards. It may also be used in processed foods rather than being sold as whole produce.
- Due to the relatively short shelf life of most fruits, waste can be a challenge in the fruit industry. Significant amounts of fruit are lost or wasted through the supply chain from farm to consumer.
- Processing fruits into juices, jams, and other storage techniques generates waste such as peels, seeds, pulp, and wastewater.

Transportation

- Fruits require unique climates and growth conditions. Fruits are often transported long distances by cargo ship and/or semi-truck.
- Due to very short shelf lives, fruits, especially berries, are sometimes transported by air, which has the highest carbon footprint of any food transportation method.



Because we can transport food, cold climates in the United States can access fresh fruits in the winter time that were grown in warmer climates in the Southern Hemisphere.

VEGETABLES



Land Use

- Farmers need land to grow vegetable crops.
- After the harvest, land is needed for processing and storage facilities.

Greenhouse Gas Emissions

- Land-Use Change: Converting natural ecosystems to fields and orchards to grow food can release CO₂ from the vegetation that is removed and the soil that is disturbed by various forms of tilling.
- The production of plastic used in many types of food packaging contributes to CO₂ emissions.

Inputs

- Fertilizers are used to maintain the nutrient content of soil where fruit trees, bushes, and vines are grown.
- Fruits are susceptible to pests during the growing process. Pesticides help avoid crop loss.
- Vegetable farms use tractors and various types of planting and harvesting machinery.

Water Use

- Vegetable crops in most climates use water for irrigation.
- Water is used in the processing of vegetables. Examples include cleaning equipment, blanching, or canning.
- Fertilizer use can contribute to water pollution.

Energy

- Sometimes vegetable crops are grown in greenhouses. Fossil fuel energy is most common to heat and cool greenhouses.
- Some vegetables require cold storage and refrigeration to lengthen the shelf life of the produce so it can reach the consumer.



To allow year-round growth, sometimes tomatoes are grown in greenhouses. Significant fossil fuels are burned for heating and ventilation to artificially create the correct climate for crop growth.

Waste

- Sometimes vegetables are sorted and discarded if they don't meet specific aesthetic standards. Abnormally shaped vegetables may also be used in processed foods rather than being sold as whole produce.
- Due to the relatively short shelf life of most fresh vegetables, waste can be a challenge. Significant amounts of vegetables are lost or wasted through the supply chain from farm to consumer.
- Processing vegetables into canned, frozen, or freeze-dried produce generates waste such as peels, seeds, pulp, and wastewater.

Transportation

- Vegetable crops require unique climates and growth conditions. Vegetables are often transported by cargo ship and/or semi truck.
- Fresh vegetables are available year-round in most grocery stores in the United States. This requires transporting foods long distances from where there is a suitable climate.



NUTS



Land Use

- Farmers need land to grow nut crops. Each tree, depending on the variety, needs to be spaced 15-30 feet apart.
- After the harvest, land is needed for processing and storage facilities.
- Some nut tree orchards require buffer zones between their farm and other pieces of land.

Greenhouse Gas Emissions

- Land-Use Change: Converting natural ecosystems to fields and orchards to grow food can release CO₂ from the vegetation that is removed and the soil that is disturbed by various forms of tilling.
- The production of plastic used in many types of food packaging contributes to CO₂ emissions.

Inputs

- Nut trees require pest management and fertilizer.
- Nut farms use a variety of machinery such as tractors, shakers for harvesting, sweepers, and automatic hulling and shelling equipment that all requires resources along secondary supply chains.

Water Use

- Nut orchards require irrigation to keep trees healthy and nut crops productive.
- Fertilizer use can contribute to water pollution.



Energy

- Irrigation systems are powered by pumps and pipelines that are often powered by fossil fuels.
- Nuts are stored in controlled temperature environments and cold storage.



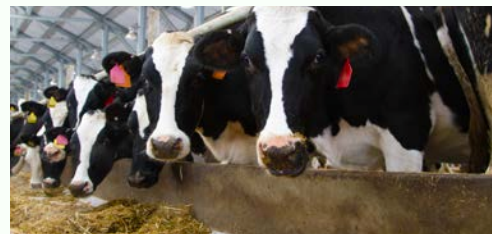
In the right conditions, nuts have a relatively long shelf-life. The nuts are stored in climate-controlled warehouses and cold storage facilities.

Waste

- Most nuts have shells or hulls (outer coverings) that have no nutritional value or use to humans. These byproducts can be fed to cattle, giving an opportunity to upcycle a product that would otherwise end up in a landfill. Practices like these can help improve the overall environmental footprint of food.



This is a pile of almond hulls outside of a processing plant.



Almond hulls can be mixed in a feed ration for cattle.

Transportation

- Nuts that are shipped overseas travel by cargo ship.
- California, Georgia, Texas, Oregon, and New Mexico are the top 5 nut-producing states in the U.S. Semi trucks transport nuts within the U.S.



GRAINS



Land Use

- Farmers need land to grow grain crops.
- After the harvest, land is needed for processing and storage facilities.

Greenhouse Gas Emissions

- Land-Use Change: Converting natural ecosystems to fields and orchards to grow food can release CO₂ from the vegetation that is removed and the soil that is disturbed by various forms of tilling.
- Flooded rice paddies create anaerobic conditions that produce methane.



Inputs

- Fertilizers are used to maintain the nutrient content of soil where grain crops are grown.
- All plants are susceptible to pests during the growing process. Pesticides help avoid crop loss, but the production of synthetic pesticides emit CO₂.

Water Use

- Grain crops need water to grow. Some climates offer adequate rain fall. Other climates require irrigation.
- Water is used in some storage and processing procedures.
- Fertilizer use can contribute to water pollution, especially if it isn't managed correctly.

Energy

- The creation of synthetic pesticides and fertilizers requires a lot of energy.
- Electricity and natural gas are used to dry and mill different grains.
- Grain storage facilities require temperature and humidity control that is likely powered by fossil fuels.



Waste

- Poor storage conditions lead to mold and fungal growth that lead to crop loss.
- Grains can be significantly affected by pests like insects and rodents or fungal diseases. If not controlled, substantial crop losses can occur.

Transportation

- Grain is transferred from the farm to storage and processing facilities and then again to grocery stores.
- With a relatively long shelf life, grain products can be shipped near or far.

